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PRESSURE AND VIBRATION TEST OF THE ACA/A395 CONTAINER FOR THE B--ETC(U)
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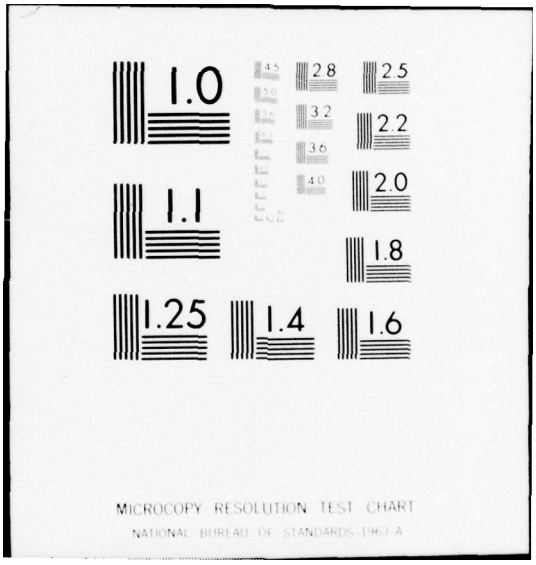
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PRESSURE AND VIBRATION TEST OF THE ACA/A395 CONTAINER FOR THE BL-755 SEEK CLUSTER BOMB UNIT

AFALD/PTPD
AIR FORCE PACKAGING EVALUATION AGENCY
Wright-Patterson AFB OH 45433

March 1977

ABSTRACT

The Air Force Packaging Evaluation Agency (AFPEA) has been involved in several "compare and contrast" type situations where a series of tests are performed on multiple containers designed to protect the same item. This was the case in testing of containers for the BL-755 seek cluster bomb unit. According to the test plan developed at HQ ADTC/SDMT Eglin AFB FL three containers were to be tested to determine the better container to use for protection of the BL-755. Testing was conducted at both the AFPEA and Eglin AFB.

The third container in this series was recently tested at the AFPEA with ADTC/SDMT personnel present. The container passed the vibration test but failed to hold the specified air pressure due to leaks in the system.

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TABLE OF CONTENTS

INTRODUCTION

HQ ADTC/SDMT Eglin AFB FL requested Air Force Packaging Evaluation Agency (AFPEA) conduct vibration and pressure tests on an ACA/A395 container for the BL-755 seek cluster bomb. This testing was the third in a series of comparative evaluations to determine a replacement container for this item.

The subject container (see Figure 1, page 5) arrived at the AFPEA on 9 March 1977. Upon arrival, the container was inspected and found to have the bottom cradle plate missing. This plate was then requested from Eglin AFB and arrived at the AFPEA on 10 March 1977. It was then installed and the seek cluster bomb loaded and secured (see Figures 2, 3, and 4, pages 5 and 6). The container was tested and evaluated on 10 March 1977. A representative from ADTC/SDMT was present and assisted in all testing conducted.

TEST OUTLINE

The following tests were performed on the ACA/A395 (see Figure 1, page 5) in the order shown in accordance with FTMS 101B.

TEST #	TEST	FTMS METHOD
A1	Leak, Pressure (Inner Bag)	5009
A2	Leak, Pressure (Container)	5009
B	Vibration (Repetitive Shock)	5019
A3	Leak, Pressure (Inner Bag)	5009

TEST PROCEDURES AND RESULTS

1. Pressure Test (A1). The test apparatus used in this test was a MERIAM model RC-4615 water manometer graduated in 0.20". After the bag was closed using both the iner and outer zipper closures, a manometer was connected in line with the inner bag. An air supply was connected to the line test apparatus and the container filled with air to approximately 0.3 psi. The procedure in FTMS 101B Method 5009 para 1.2(c) was followed without alteration.

The results of this test are shown in tabulated form below.

TABLE I

TIME (SECONDS)	INCHES H_2O DISPLACED	PSIG
00	8.4	.304
30	7.4	.267
60	6.5	.235
90	5.5	.199
120	4.6	.166
150	3.8	.137
180	3.5	.126
210	3.2	.116
240	2.0	.108
270	2.8	.103
300	2.6	.098

A bubble-supporting liquid was applied to the zipper area as well as other areas that could conceivably cause a container air leak. There was no bubbling on any area tested, however, many areas were not accessible for test and inspection because of the complex seal area configuration. The air supply, lines, and manometer hook-up were also totally tested and no leak was found there. Therefore, it was determined that the pressure drop was due to an air leak in the container bag.

2. Pressure Test (A2). The test apparatus for the second pressure test was identical to that described above (in test A1). In this test, however, the outer container was being evaluated. The fiberglass outer container was fastened in place and all eight hold down lugs were tightened. Air was introduced at an air inlet fabricated by the AFPEA personnel. Again, FTMS 101B Method 5009 para 1.2(c) was followed without exception.

The container failed to hold pressure even when the line pressure was increased from 2 to 6 psi gradually. The bubble-supporting liquid was applied to the container seams and closures. Multiple air leaks were found on each corner and at various points on each seam.

3. Vibration Test (B). The ACA/A395 seek cluster container provided by ADTC Eglin AFB FL and containing an inert BL-755 bomb warhead section was subjected to Federal Test Method Standard 101 Method 5019 Vibration (Repetitive Shock) Test without exception using the option which specifies maximum platform acceleration to be 1 $\pm$ 0.1 times the acceleration of gravity. During test, the container left the platform. A 1/16 inch thick feeler gauge was used to establish vibration table input by increasing the drive frequency until the 1/16 inch feeler gauge would pass freely under the container during the bounce portion of the vibration cycle. The table drive frequency maintained for the two hour test period was 4.4 Hz with table peak acceleration being .99 G and table double amplitude displacement being 1.0 inch.

The vibration test was performed on a L.A.B. Corporation vibration machine, serial 56801, type 5000-96B, which has a frequency servoloop constant displacement cam linked motor dirve. The L.A.B. Corporation vibration machine's maximum load capacity is 5000 pounds vibrated at 3 Gs peak sinusoidal acceleration or 1.0 inch double amplitude displacement from 0 to 40 Hz. A 144" x 96" x 1.5" plywood deck was mounted on the 96" x 98" vibration machine table and provided an adequately supported, flat bearing surface for the 1013 pound 73" x 28" x 36" container. Excessive horizontal container motion was limited by barricades nailed to the plywood deck 1/2 inch from the container centered on the vibration machine table. Instrumentation consisted of a tachometer and cam displacement indicator integral to the L.A.B. Corporation vibration machine.

Post test container inspection indicated that container damage resulting from the vibration test consisted of minor abrasion of the rubberized fabric bag. One 1/2 inch square area abraded to bag fabric, but not through the bag, was located in the left front inner bag top and apparently resulted from contact with the fiberglass cradle mount left front corner which was unpadded. Other abraded areas were located on the outer left front side slightly below the closure seam and apparently resulted from bag contact with the fiberglass container cover. No other damage to either the container or the BL-755 bomb warhead section was observed.

4. Pressure Test (A3). The apparatus and procedure for this third pressure test of container and bag were identical to the first pressure test (A1) described above.

Results of the third pressure test were almost exactly the same as the first results (see Table I). There was, again, no indication of a leak when the bubble-supporting liquid was applied to accessible areas.

DISCUSSION

The ACA/A395 seek cluster container successfully passed the repetitive shock vibration test. The detected leak in the container interior bag and leaks found in the outer container must be corrected for this container to provide MIL-P-116 Method II (Water-Vaporproof Barrier with Desiccant), or Method IA (Water-Vaporproof Enclosure) protection. When these discrepancies are rectified, the container should prove to be adequate to provide the intended protection. The additional testing being planned at HQ ADTC/SDMT will also play a large part in qualifying this container.

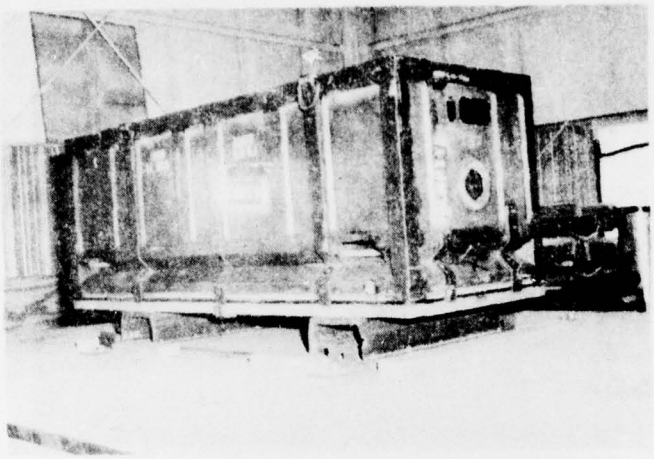

FIGURE 1. LOADED CONTAINER ON VIBRATION TABLE

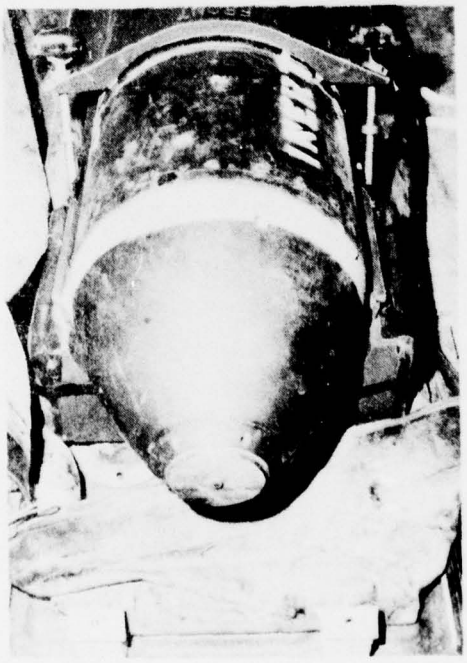

FIGURE 2. CONTAINER AND BAG (FORWARD END)

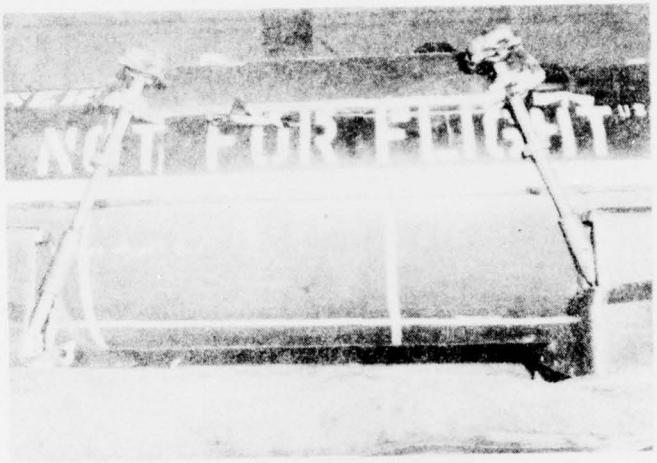

FIGURE 3. HOLD DOWN SYSTEM

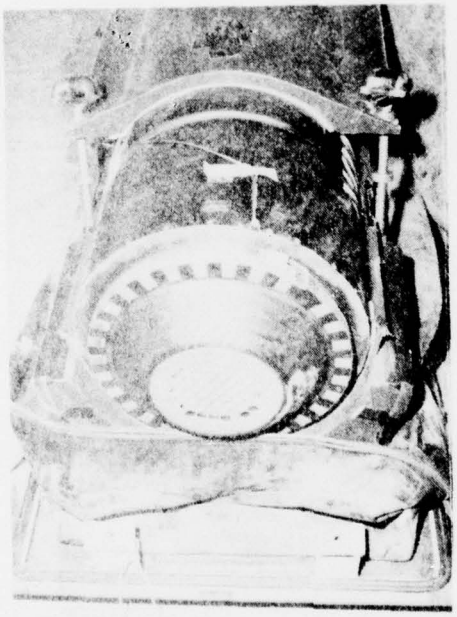

FIGURE 4. CONTAINER AND BAG (AFT END)

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VIBRATION TEST	CONTAINER	FIBERGLASS	
CRADLE PLATE	PRESSURE TEST	SHOCK MOUNT	

20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

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